CONTENTS

NUMBER 1, JANUARY, 1956

PAGE

Properties of Certain Protease Systems Used in Breadmaking. *John A. Johnson, Byron S. Miller, P. D. Boyer, and W. F. Geddes* . . . 1

A Microbiological Method for Determination of Cystine in Foods. *Millard J. Horn and Amos E. Blum* . . . 18

The Carbohydrates of the Gramineae. VI. The Nature of the Water-Soluble Polysaccharides of the Flour of Wheat (*Triticum vulgare*). *K. A. Gilles and F. Smith* . . . 29

Extraction of Rice Proteins. *Russell T. McIntyre and Krishna Kymal* . . . 38

Grain Storage Studies. XIX. Influence of Mold Infestation and Temperature on the Deterioration of Wheat During Storage at Approximately 12% Moisture. *Moishe Golubchuk, Heinz Sorger-Domenigg, L. S. Cuendet, C. M. Christensen, and W. F. Geddes* . . . 45

Grain Storage Studies. XXII. Influence of Oxygen and Carbon Dioxide Concentrations on Mold Growth and Grain Deterioration. *Anne Peterson, Vera Schlegel, B. Hummel, L. S. Cuendet, W. F. Geddes, and C. M. Christensen* . . . 53

The Intrinsic Viscosities of the Water-Soluble Components of Wheat Flour. *Doyle C. Udy* . . . 67

Relations between Wheat Protein Content, Loaf Volume, Expansion Volume, and Sedimentation Value. I. Plant Breeders' Samples. *R. H. Harris and L. D. Sibbitt* . . . 74

NUMBER 2, MARCH, 1956

A Study of the Desorption Isotherms of Wheat at 25°C. and 50°C. *H. A. Becker and H. R. Sallans* . . . 79

The Effect of Sucrose on the Properties of Some Starches and Flours. *E. Elizabeth Hester, Alice M. Briant, and Catherine J. Personius* . . . 91

A Semimicro Baking Procedure, with Mechanical Dough Handling, Primarily Designed for Evaluation of Additives. *M. A. Cookson and Margaret L. Ritchie* . . . 102

A New Method of Fractionating Wheat Flour. *William F. Sollars* 111

Evaluation of Flour Fractions for Their Importance to Cookie Quality. *William F. Sollars* 121

Enzymes that Degrade Barley Gums. IV. Studies of Varietal Differences in Endo-beta-Polyglucosidase Activity. *E. J. Bass and W. O. S. Meredith* 129

A Small-Scale Dough Mixer for Use in Wheat Quality Work. *H. Miller, J. Edgar, and A. G. O. Whiteside* 136

A Simple Method for Detecting Contamination of Wheat by Rodent Urine. *J. W. Laakso, Madelyn Ferrigan, M. O. Schultze, and W. F. Geddes* 141

Pyrethrins-Piperonyl Butoxide as a Residual Treatment against Insects in Elevator Boots. *F. L. Watters* 145

Book Reviews 151

NUMBER 3, MAY, 1956

The Effects on Flour Dough and Bread Quality of Molds Grown in Wheat and Those Added to Flour in the Form of Specific Cultures. *Y. Pomeranz, P. Halton, and F. G. Peers* 157

Effects on Baking Powder Biscuits of Four Flour Components Used in Two Proportions. *Mary V. Zaehringer, Alice M. Briant, and Catherine J. Personius* 170

Observations on the Influence of Texturation, Occluded Gas Content, and Emulsifier Content on Shortening Performance in Cake Making. *S. W. Thompson and J. E. Gannon* 181

Estimation of Protein in Wheat and Flour by Ion-Binding. *Doyle C. Udy* 190

Controlled Degradation of Waxy-Corn Starch by Malt Alpha-Amylase. *R. L. Lohmar, F. B. Weakley, and G. E. Lauterbach* 198

Effect of Calcium Stearyl-2-Lactylate in Bread Made with Nonfat Milk Solids of Varying Baking Quality. *W. B. Bechtel, G. E. Hammer, and J. G. Ponte, Jr.* 206

The Effect of Light on Vitamin Retention in Enriched White Bread. *Kenneth Morgareidge* 213

NUMBER 4, JULY, 1956

Comparative Study of the Improving Action of Bromate and Iodate by Baking Data, Rheological Measurements, and Chemical Analyses. *C. J. Dempster, D. K. Cunningham, M. H. Fisher, I. Hlynka, and J. A. Anderson* 221

The Penetration of Urea and Orthophosphate into the Wheat Kernel. *Madelyn Ferrigan, C. Norris, P. D. Boyer, and W. F. Geddes* 240

A Study of the Relation between Time, Temperature, Moisture Content, and Loaf Volume by the Bromate Formula in the Heat Treatment of Wheat and Flour. *H. A. Becker and H. R. Sallans* 254

The Heating Characteristics of an Amylograph. *Stephen J. Loska, Jr., and James A. Day* 266

Relations between Wheat Protein Content, Loaf Volume, Expansion Volume, and Sedimentation Value. II. Samples Delineated by Particle Size. *R. H. Harris and L. D. Sibbitt* 273

NUMBER 5, SEPTEMBER, 1956

Correlation of Farinograph, Mixograph, Sedimentation, and Baking Data for Hard Red Winter Wheat Flour Samples Varying Widely in Quality. *Byron S. Miller, Bette Hays, and John A. Johnson* 277

Decomposition of Bromate in Fermenting and Nonfermenting Doughs. *D. K. Cunningham and J. A. Anderson* 290

Investigations of the Water-Soluble Nitrogenous Fraction of Rice. *Russell T. McIntyre* 299

The Application of Enzymes in Pre-Ferment Processes for Bread Production. *Leo P. Carroll, Byron S. Miller, and John A.* Johnson 303

A Method of Analyzing Extensograms of Dough. *Ben Grogg and Diane Melms* 310

The Use of a Starch-Iodine Blue Test as a Quality Indicator of White Milled Rice. *John V. Halick and Kenneth K. Keneaster* 315

Determination of the Degree of Polishing in Rice. IV. Percentage Loss of Phosphorus as an Index of the Degree of Milling. *H. S. R. Desikachar* 320

Changes Leading to Improved Culinary Properties of Rice on Storage. *H. S. R. Desikachar* 324

NUMBER 6, NOVEMBER, 1956

Structure of the Mature Wheat Kernel. I. Gross Anatomy and Relationships of Parts. *Dorothy Bradbury, Irene M. Cull, and Majel M. MacMasters* 329

Structure of the Mature Wheat Kernel. II. Microscopic Structure of Pericarp, Seed Coat, and Other Coverings of the Endosperm and Germ of Hard Red Winter Wheat. *Dorothy Bradbury, Majel M. MacMasters, and Irene M. Cull* 342

Structure of the Mature Wheat Kernel. III. Microscopic Structure of the Endosperm of Hard Red Winter Wheat. *Dorothy Bradbury, Majel M. MacMasters, and Irene M. Cull* 361

Structure of the Mature Wheat Kernel. IV. Microscopic Structure of the Germ of Hard Red Winter Wheat. *Dorothy Bradbury, Majel M. MacMasters, and Irene M. Cull* 373

Communication to the Editor 392

Index to Volume 33 391

AUTHORS

PAGE

Anderson, J. A. (see D. K. Cunningham) ... 290
——— (see C. J. Dempster) ... 221

Bass, E. J., and W. O. S. Meredith. Enzymes that degrade barley gums. IV. Studies of varietal differences in endo-beta-polyglucosidase activity ... 129

Bechtel, W. G., G. E. Hammer, and J. G. Ponte, Jr. Effect of calcium stearyl-2 lactylate in bread made with nonfat milk solids of varying baking quality ... 206

Becker, H. A., and H. R. Sallans. A study of the desorption isotherms of wheat at 25°C. and 50°C. ... 79
———, **and** ———. A study of the relation between time, temperature, moisture content, and loaf volume by the bromate formula in the heat treatment of wheat and flour ... 254

Blum, A. E. (see M. J. Horn) ... 18

Boyer, P. D. (see Madelyn Ferrigan) ... 240
——— (see J. A. Johnson) ... 1

Bradbury, Dorothy, Irene M. Cull, and Majel M. MacMasters. Structure of the mature wheat kernel. I. Gross anatomy and relationships of parts ... 329
———, **Majel M. McMasters, and Irene M. Cull.** Structure of the mature wheat kernel. II. Microscopic structure of pericarp, seed coat, and other coverings of the endosperm and germ of hard red winter wheat ... 342
———, ———, **and** ———. Structure of the mature wheat kernel. III. Microscopic structure of the endosperm of hard red winter wheat ... 361
———, ———, **and** ———. Structure of the mature wheat kernel. IV. Microscopic structure of the germ of hard red winter wheat 373

Briant, Alice M. (see E. Elizabeth Hester) ... 91
——— (see Mary V. Zaehringer) ... 170

PAGE

Carroll, L. P., B. S. Miller, and J. A. Johnson. The application of enzymes in pre-ferment processes for bread production ... 303

Christensen, C. M. (see M. Golubchuk) ... 45
——— (see Anne Peterson) ... 53

Cookson, M. A., and Margaret L. Ritchie. A semimicro baking procedure, with mechanical dough handling, primarily designed for evaluation of additives ... 102

Cuendet, L. S. (see M. Golubchuk) ... 45
——— (see Anne Peterson) ... 53

Cull, Irene M. (see Dorothy Bradbury) ... 329, 342, 361, 373

Cunningham, D. K. (see C. J. Dempster) ... 221
———, **and J. A. Anderson.** Decomposition of bromate in fermenting and nonfermenting doughs ... 290

Day, J. A. (see S. J. Loska, Jr.) ... 266

Dempster, C. J., D. K. Cunningham, M. H. Fisher, I. Hlynka, and J. A. Anderson. Comparative study of the improving action of bromate and iodate by baking data, rheological measurements, and chemical analyses 221

Desikachar, H. S. R. Determination of the degree of polishing in rice. IV. Percentage loss of phosphorus as an index of the degree of milling ... 320
———. Changes leading to improved culinary properties of rice on storage ... 324

Edgar, J. (see H. Miller) ... 136

Ferrigan, Madelyn (see J. W. Laakso) ... 141
———, **C. Norris, P. D. Boyer, and W. F. Geddes.** The penetration of urea and orthophosphate into the wheat kernel ... 240

Fisher, M. H. (see C. J. Dempster) ... 221

Gannon, J. E. (see S. W. Thompson) ... 181

Geddes, W. F. Book review: Official methods of analysis of the Association of Official Agricultural Chemists, 8th ed. ... 154
———(see Madelyn Ferrigan) ... 240
———(see M. Golubchuk) ... 45
———(see J. A. Johnson) ... 1
———(see J. W. Laakso) ... 141
———(see Anne Peterson) ... 53

Gilles, K. A., and F. Smith. The carbohydrates of the Gramineae. VI. The nature of the water-soluble polysaccharides of the flour of wheat (**Triticum vulgare**) ... 29

Golubchuk, M., H. Sorger-Domenigg, L. S. Cuendet, C. M. Christensen, and W. F. Geddes. Grain storage studies. XIX. Influence of mold infestation and temperature on the deterioration of wheat during storage at approximately 12% moisture ... 45

Grogg, B. A method of analyzing extensograms of dough ... 310

Halick, J. V., and K. K. Keneaster. The use of a starch-iodine blue test as a quality indicator of white milled rice ... 315

Hall, H. H. Book review: Industrial fermentations, Vol. II, ed. by L. A. Underkofler and R. J. Hickey ... 152

Halton, P. (see Y. Pomeranz) ... 157

Hammer, G. E. (see W. G. Bechtel) ... 206

Harris, R. H., and L. D. Sibbitt. Relations between wheat protein content, loaf volume, expansion volume, and sedimentation value. I. Plant breeders' samples ... 74
———, **and** ———. Relations between wheat protein content, loaf volume, expansion volume, and sedimentation value. II. Samples delineated by particle size ... 273

Hays, Bette (see B. S. Miller) ... 277

Hester, E. Elizabeth, Alice M. Briant, and Catherine J. Personius. The effect of sucrose on the properties of some starches and flours ... 91

Hlynka, I. Revised data for Cereal Chem. 32: 463 (1955) (Communication to the Editor) ... 392
———(see C. J. Dempster) ... 221

Horn, M. J., and A. E. Blum. A microbiological method for determination of cystine in foods ... 18

Hummel, B. (see Anne Peterson) ... 53

Johnson, J. A., P. D. Boyer, and W. F. Geddes. Properties of certain protease systems used in breadmaking ... 1
———(see Leo P. Carroll) ... 303
———(see B. S. Miller) ... 277

Keneaster, K. K. (see J. V. Halick) 315
Kymal, K. (see R. T. McIntyre) ... 38

Laakso, J. W., Madelyn Ferrigan, M. O. Schultze, and W. F. Geddes. A simple method for detecting contamination of wheat by rodent urine ... 141

Lauterbach, G. E. (see R. L. Lohmar) ... 198

Lee, J. W. Book review: Organic chemistry simplified, by R. Macy 154

Liener, I. E. Book review: Radioisotopes in biology and agriculture, principles and practice ... 153

Lohmar, R. L., F. B. Weakley, and G. E. Lauterbach. Controlled degradation of waxy-corn starch by malt alpha-amylase ... 198

Loska, S. J., Jr., and J. A. Day. The heating characteristics of an amylograph ... 266

McIntyre, R. T. Investigations of the water-soluble nitrogenous fraction of rice ... 299
———, **and K. Kymal.** Extraction of rice proteins ... 38

MacMasters, Majel M. (see Dorothy Bradbury) ... 329, 342, 361, 373

Melms, Diane (see B. Grogg) ... 310

Meredith, W. O. S. (see E. J. Bass) 129

Miller, B. S., Bette Hays, and J. A. Johnson. Correlation of farinograph, mixograph, sedimentation, and baking data for hard red winter wheat flour samples varying widely in quality ... 277
———(see L. P. Carroll) ... 303

Miller, H., J. Edgar, and A. G. O. Whiteside. A small-scale dough mixer for use in wheat quality work 136

Morgareidge, K. The effect of light on vitamin retention in enriched white bread 213

Norris, C. (see Madelyn Ferrigan) 240

Peers, F. G. (see Y. Pomeranz) ... 157

Personius, Catherine J. (see E. Elizabeth Hester) 91

——— (see Mary V. Zaehringer .. 170

Peterson, Anne, Vera Schlegel, B. Hummel, L. S. Cuendet, W. F. Geddes, and C. M. Christensen. Grain Storage studies. XXII. Influence of oxygen and carbon dioxide concentrations on mold growth and grain deterioration .. 53

Pomeranz, Y., P. Halton, and F. G. Peers. The effects on flour dough and bread quality of molds grown in wheat and those added to flour in the form of specific cultures 157

Ponte, J. G., Jr. (see W. G. Bechtel) 206

Ritchie, Margaret L. (see M. A. Cookson) 102

Sallans, H. R. (see H. A. Becker) 79, 254

Schlegel, Vera (see Anne Peterson) 53

Schultze, M. O. (see J. W. Laakso) 141

Sibbitt, L. D. (see R. H. Harris) 74, 273

Smith, F. (see K. A. Gilles) 29

Sollars, W. F. A new method of fractionating wheat flour 111

———. Evaluation of flour fractions for their importance to cookie quality 121

Sorger-Domenigg, H. (see M. Golubchuk) 45

Thompson, S. W., and J. E. Gannon. Observations on the influence of texturation, occluded gas content, and emulsifier content on shortening performance in cake making 181

Udy, D. C. The intrinsic viscosities of the water-soluble components of wheat flour 67

———. Estimation of protein in wheat and flour by ion-binding . 190

Watters, F. L. Pyrethrins-piperonyl butoxide as a residual treatment against insects in elevator boots 145

Weakley, R. B. (see R. L. Lohmar) 198

Whiteside, A. G. O. (see H. Miller) 136

Wickerham, L. F. Book review: Industrial fermentations, Vol. I, ed. by L. A. Underkofler and R. J. Hickey 151

Zaehringer, Mary V., Alice M. Briant, and Catherine J. Personius. Effects on baking powder biscuits of four flour components used in two proportions 170

SUBJECTS

PAGE

Alveograph
For measuring dough resistance (revised data for Hlynka and Barth: Vol. 32, p. 463, 1955) 392

Amino acids
Cystine, determination in foods, microbiological method (Horn and Blum) 18

Amylase, alpha-
Malt, for controlled degradation of waxy-corn starch (Lohmar, Weakley, and Lauterbach) 198

Amylograph
Heating characteristics of (Loska and Day) 266

Baking tests
Baking-powder biscuits, effect of reconstituted flours on (Zaehringer, Briant, and Personius) 170

Correlation of farinograph, mixograph, sedimentation, and baking data for determining flour quality (Miller, Hays, and Johnson) 277

Evaluation of additives, semimicro procedure (Cookson and Ritchie) 102

Improving action of bromates and iodates on bread quality (Dempster, Cunningham, Fisher, Hlynka, and Anderson) 221

Barley
Malting quality vs. cytolytic activity (Bass and Meredith) 129

Varietal differences in endo-beta-polyglucosidase activity (Bass and Meredith) 129

Book reviews
Industrial Fermentations, Vol. I, ed. by L. A. Underkofler and R. J. Hickey (Wickerham) 151

Industrial Fermentations, Vol. II, ed. by L. A. Underkofler and R. J. Hickey (Hall) 152

Official Methods of Analysis of the Association of Official Agricultural Chemists, 8th ed. (Geddes) 154

Organic Chemistry Simplified, by R. Macy, 2nd ed. (Lee) 154

Radioisotopes in Biology and Agriculture, Principles and Practice, by C. L. Comar (Liener) 153

Bread (see also **Bread quality**)
Effect of proteolytic activity of fungal preparation and malted wheat flour (Johnson, Miller, Boyer, and Geddes) 1

Enriched, effect of light on vitamin retention (Morgareidge) 213

Milk (nonfat) solids in, effect of calcium stearyl-2 lactylate on baking quality (Bechtel, Hammer, and Ponte) 206

Pre-ferment processes for, application of enzymes in (Carroll, Miller, and Johnson) 303

Bread quality
Effect of calcium stearyl-2 lactylate used with nonfat milk solids (Bechtel, Hammer, and Ponte) 206

Effect of molds grown in wheat, and mold cultures (Pomeranz, Halton, and Peers) 157

Improving action of bromates and iodates (Dempster, Cunningham, Fisher, Hlynka, and Anderson) 221

Bromates, see under **Flour improvers,** Bromates and iodates

Cake(s)
Effect of texturation, occluded gas content, and emulsifier content on shortening performance (Thompson and Gannon) 181

Calcium stearyl-2 lactylate
Effect in bread made with nonfat milk solids (Bechtel, Hammer, and Ponte) 206

Cereals and cereal products
Stored, see **Storage studies**

Cookie flour
Fractionation procedure with acetic acid (Sollars) 111
Importance of flour fractions to cookie quality (Sollars) 121

Cystine
In foods, microbiological method for determining (Horn and Blum) 18

Detergent solutions
Santomerse No. 3, for extracting rice proteins (McIntyre and Kynal) 38

Dextrins
By controlled degradation of waxy-corn starch with malt alpha-amylase (Lohmar, Weakley, and Lauterbach) 198

Dough improvers, see **Flour improvers**

Dough mixer
Small-scale, for wheat quality work (Miller, Edgar, and Whiteside) 136

Dough(s)
Effect of molds grown in wheat, and mold cultures (Pomeranz, Halton, and Peers) 157
Pre-ferment processes, application of enzymes in (Carroll, Miller, and Johnson) 303
Resistance of, measured with Chopin Alveograph (revised data for Hlynka and Barth: Vol. 32, p. 463; 1955) 392

Emulsifiers
Effect on shortening performance in cake-baking (Thompson and Gannon) 181

Enzymes
Application in pre-ferment processes (Carroll, Miller, and Johnson) 303

Extensograms and extensograph studies
Effect of absorption and salt variation on (Grogg and Melms) 310
Method of analyzing (Grogg and Melms) 310

Fermentation
Use of pre-ferments in breadmaking (Carroll, Miller, and Johnson) 303

Flour (see also **Flour fractionation; Flour improvers; Flours, baking quality of**)
Bromates in, see **Flour improvers**
Cookie, see **Cookie flour**
Effect of sucrose on properties of (Hester, Briant, and Personius) 91
Enriched, vitamin retention in bread made from (Morgareidge) 213
Expansion volume of, as measurement of quality (Harris and Sibbitt) 273
Fractionated, see **Flour fractionation**
From hard red winter wheats of varying quality, correlation of tests for (Miller, Hays, and Johnson) 277
Particle size of, effect on protein content and loaf volume (Harris and Sibbitt) 273
Protein content of, relation to particle size (Harris and Sibbitt) 273
Reconstituted (see also **Flour fractionation**)
effect of varying components on baking-powder biscuits (Zaehringer, Briant, and Personius) 170
Sedimentation test for
vs. Protein content, loaf volume, and expansion volume (Harris and Sibbitt) 74
as measurement of quality (Harris and Sibbitt) 273

Flour fractionation
Effect of reconstituted proportions on baking-powder biscuits (Zaehringer, Briant, and Personius) 170
Procedure with acetic acid (Sollars) 111

Flour improvers
Bromate (potassium)
decomposition in fermenting and nonfermenting doughs (Cunningham and Anderson) 290
hypotheses of improving action (Cunningham and Anderson) 290

Bromate and iodate, comparative study on four different flour grades (Dempster, Cunningham, Fisher, Hlynka, and Anderson) 221

Flour(s), baking quality of
vs. Bromate decomposition rate (Cunningham and Anderson) 290

Correlation of farinograph, mixograph, sedimentation, and baking data for studying (Miller, Hays, and Johnson) 277

Reconstituted, effect of varying proportions on baking-powder biscuits (Zaehringer, Briant, and Personius) 170

vs. Time, temperature, and moisture content (Becker and Sallans) 254

Gluten
Denaturation of, vs. time, temperature, and moisture content (Becker and Sallans) 254

Hydrolysis by various protease systems (Johnson, Miller, Boyer, and Geddes) 1

Grain storage studies, see **Storage studies**

Gums
Barley, degradation of (Bass and Meredith) 129

Of wheat flour
composition and nature of (Gilles and Smith) 29
intrinsic viscosities of components of (Udy) 67

Insecticides
Pyrethrins-piperonyl butoxide as residual treatment in elevator boots (Watters) 145

Iodates, see Flour improvers, Bromates and iodates

Lactylate, calcium stearyl-2, see **Calcium stearyl-2 lactylate**

Loaf volume
vs. Particle size (Harris and Sibbitt) 273

Malt, barley
Cytolytic activities of, vs. quality (Bass and Meredith) 129

Malt alpha-amylase
For controlled degradation of waxy-corn starch (Lohmar, Weakley, and Lauterbach) 198

Microbiological assay
Of cystine in foods (Horn and Blum) 18

Milk, dried nonfat
Effect of calcium stearyl-2 lactylate on bread made with (Bechtel, Hammer, and Ponte) 206

Milling behavior of wheat
vs. Kernel structure (Bradbury, Cull, and MacMasters) 329, 342, 361, 373

Molds
Effect on dough and bread quality (Pomeranz, Halton, and Peers) 157

Monoglycerides
Effect on shortening performance in cake-baking (Thompson and Gannon) 181

Nessler's reagent
For determining rodent urine on wheat kernels (Laakso, Ferrigan, Schultze, and Geddes) 141

Orange G dye
For estimating protein in wheat (Udy) 190

Orthophosphate
Penetration into wheat kernel (Ferrigan, Norris, Boyer, and Geddes) 240

Photomicrographs of mature wheat kernel (Bradbury, Cull, and MacMasters) 329, 342, 361, 373

Pre-ferment baking process
Application of enzymes in (Carroll, Miller, and Johnson) 303

Proteases
In breadmaking, properties of (Johnson, Miller, Boyer, and Geddes) 1

Of fungal preparations, activity on gluten (Johnson, Miller, Boyer, and Geddes) 1

Of malted wheat flour, activity on gluten (Johnson, Miller, Boyer, and Geddes) 1

Protein(s)
In rice, extraction with alkyl aryl-sulfonate-type detergent (Santomerse No. 3) (McIntyre and Kymal) 38

In wheat, estimation by ion-binding with disulfonic acid dye, orange G (Udy) 190

Proteolytic enzymes, see **Proteases**

Pyrethrins-piperonyl butoxide
As insecticide in elevator boots (Watters) ... 145

Radioactive carbon (C14) and phosphorus (P32)
For studying penetration of rodent urine into wheat kernel (Ferrigan, Norris, Boyer, and Geddes) ... 240

Rice
Cooking properties improved on storage (Desikachar) ... 324

Phosphorus loss as index of degree of milling (Desikachar) ... 320

Proteins of, extraction with alkyl aryl-sulfonate-type detergent (Santomerse No. 3) (McIntyre and Kymal) ... 38

Water-soluble nitrogenous fraction, nature of electrophoretic behavior (McIntyre) ... 299

White milled, starch-iodine blue test as quality indicator (Halick and Keneaster) ... 315

Rodent urine
Determination on wheat kernels with Nessler's reagent (Laakso, Ferrigan, Schultze, and Geddes) ... 141

Penetration into wheat kernel, study with radioactive carbon (C14) and phosphoras (P32) (Ferrigan, Norris, Boyer, and Geddes) ... 240

Sanitation
Determination of rodent urine on wheat kernels with Nessler's reagent (Laakso, Ferrigan, Schultze, and Geddes) ... 141

Shortening
Effect of texturation, occluded gas content, and emulsifier content on performance in cake making (Thompson and Gannon) ... 181

Starch(es)
Corn, waxy, controlled degradation by malt alpha-amylase (Lohmar, Weakley, and Lauterbach) ... 198

Effect of sucrose on properties of (Hester, Briant, and Personius) ... 91

Starch-iodine blue test
As quality indicator of white milled rice (Halick and Keneaster) ... 315

Stearyl-2 lactylate, calcium
Effect in bread made with nonfat milk solids (Bechtel, Hammer, and Ponte) ... 206

Storage studies
Influence of oxygen and carbon dioxide on mold growth and grain deterioration (Peterson, Schlegel, Hummel, Cuendet, Geddes, and Christensen) ... 53

With wheat
Changes in composition (Pomeranz, Halton, and Peers) ... 157

Effect of molds on bread and dough quality (Pomeranz, Halton, and Peers) ... 157

Influence of mold infestation and temperature on deterioration at 12% moisture (Golubchuk, Sorger-Domenigg, Cuendet, Christensen, and Geddes) ... 45

Influence of oxygen and carbon dioxide on mold growth and deterioration (Peterson, Schlegel, Hummel, Cuendet, Geddes, and Christensen) ... 53

Structure of wheat kernel, see **Wheat,** Structure of grain

Sugars
Effect on properties of starches and flours (Hester, Briant, and Personius) ... 91

Urea
Penetration into wheat kernel (Ferrigan, Norris, Boyer, and Geddes) ... 240

Vitamin(s)
In enriched bread, retention of (Morgareidge) ... 213

Wheat (see also **Wheat flour; Wheat germ; Wheat gums; Wheat varieties**)
Aleurone layer, role of during tempering and conditioning (Bradbury, MacMasters, and Cull) ... 361

Conditioning of, role of aleurone layer during (Bradbury, MacMasters, and Cull) 361

Desorption isotherms of (Becker and Sallans) 79

Drying of, moisture-vapor pressure desorption equilibria (Becker and Sallans) 79

Endosperm of, microscopic structure (Bradbury, MacMasters, and Cull) 361

Heat damage of, vs. time, temperature, and moisture content (Becker and Sallans) 254

Milling behavior, vs. kernel structure (Bradbury, Cull, and MacMasters) 329, 342, 361, 373

Moisture penetration into (Bradbury, MacMasters, and Cull) 342

Moisture-vapor pressure desorption equilibria (Becker and Sallans) 79

Quality of, small-scale dough mixer for studying (Miller, Edgar, and Whiteside) 136

Pentosans of, composition and nature (Gilles and Smith) 29

Polysaccharides of, composition and nature (Gilles and Smith) 29

Proteins of, estimation by ion-binding with disulfonic acid dye, orange G (Udy) 190

Rodent urine contamination of, detected with Nessler's reagent (Laakso, Ferrigan, Schultze, and Geddes) 141

Spring, polysaccharides (gums) of (Gilles and Smith) 29

Spring, hard red
Microscopic structure of endosperm (Bradbury, MacMasters, and Cull) 361

Microscopic structure of kernel parts (Bradbury, MacMasters, and Cull) 342

Properties of North Dakota Plant breeders' samples (Harris and Sibbitt) 74

Stored, see **Storage studies,** With wheat

Structure of grain. I. Gross anatomy (Bradbury, Cull, and MacMasters) 329

II. Microscopic structure of parts (Bradbury, MacMasters, and Cull) 342

III. Microscopic structure of endosperm (Bradbury, MacMasters, and Cull) 361

IV. Microscopic structure of germ (Bradbury, MacMasters, and Cull) 373

Winter, polysaccharides (gums) of (Gilles and Smith) 29

Wheat flour
Polysaccharide fractions, intrinsic viscosities of (Udy) 67

Polysaccharides of, composition and nature (Gilles and Smith) 29

Water-soluble components, intrinsic viscosities of (Udy) 67

Wheat germ
Microscopic structure (Bradbury, MacMasters, and Cull) 373

Wheat gluten, see Gluten

Wheat gum(s)
Composition and nature (Gilles and Smith) 29

Intrinsic viscosities of components (Udy) 67

Wheat kernel, see **Wheat,** Structure of grain

Wheat varieties
For cookies, fractionation studies (Sollars) 121

Differences of kernel structure (Bradbury, Cull, and MacMasters) 329

Effect of proportions of soft and hard wheat fractions on baking powder biscuits (Zaehringer, Briant, and Personius) 170

Hybrids grown in Mexico and North Dakota, comparison of properties (Harris and Sibbitt) 74

Plant breeders' samples, protein content, expansion volume, sedimentation value, and loaf volume (Harris and Sibbitt) 74

Water-soluble components, intrinsic viscosities of (Udy) 67